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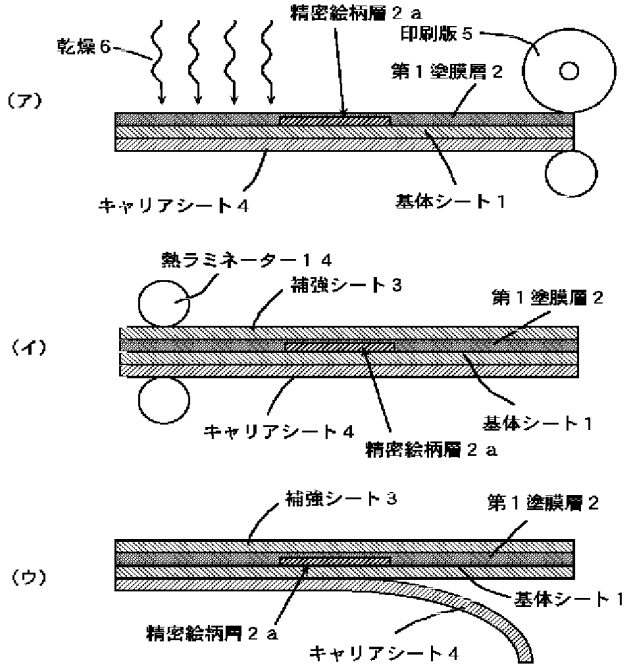
(54)【発明の名称】　絵付けシートの製造方法および立体加工された絵付けシートの製造方法、立体形状絵付け成形品

(57)【要約】　（修正有）
【課題】　絞りの深い立体形状加工に適した基体シートおよび補強シートを用い、これらの間に塗膜層を形成する際に、印刷や塗装後の精密絵柄パターン部の位置ズレ、歪み、寸法変化が生じない絵付けシートの製造方法。
【解決手段】　熱変質温度が乾燥温度および基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有するキャリアシートの上面と上記基体シートの下面とを貼り合わせ、基体シートの上面に上記第１塗膜層を形成し、第１塗膜層の上面と上記補強シートの下面とを貼り合わせた後、キャリアシートを剥がす。



【特許請求の範囲】
【請求項１】　熱変質温度（熱変質温度とは、ＪＩＳＫ７１２７－１９８９の測定方法に基づいて基体シートおよび補強シートの引張試験を各環境温度下で実施したときのヤング率がそれぞれの２５℃の環境温度下でのヤング率の８０％以下になる境界の温度－以下同じ）が共に３５～１８０℃の範囲にある基体シートの上面と補強シートの下面とが貼り合わせられ且つその間にパターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内の精密絵柄層を少なくとも含む第１塗膜層が形成された絵付けシートを、第１塗膜層の乾燥温度および基体シートと補強シートの貼り合わせ時にかかる熱の温度のうち少なくとも一つが基体シートおよび補強シートの熱変質温度以上となる条件で製造する方法であって、
熱変質温度が上記乾燥温度および上記基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有するキャリアシートの上面と上記基体シートの下面とを貼り合わせ、基体シートの上面に上記第１塗膜層を形成し、第１塗膜層の上面と上記補強シートの下面とを貼り合わせた後、キャリアシートを剥がすことを特徴とする絵付けシートの製造方法。
【請求項２】　前記キャリアシートの上面と前記基体シートの下面とを貼り合わせる前に、前記キャリアシートの上面に第２塗膜層を形成する請求項１記載の絵付けシートの製造方法。
【請求項３】　前記キャリアシートを剥がす前に、前記補強シートの上面に第２塗膜層を形成する請求項１または請求項２のいずれかに記載の絵付けシートの製造方法。
【請求項４】　熱変質温度（熱変質温度とは、ＪＩＳＫ７１２７－１９８９の測定方法に基づいて基体シートおよび補強シートの引張試験を各環境温度下で実施したときのヤング率がそれぞれの２５℃の環境温度下でのヤング率の８０％以下になる境界の温度－以下同じ）が共に３５～１８０℃の範囲にある基体シートの上面と補強シートの下面とが貼り合わせられ且つその間にパターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内の精密絵柄層を少なくとも含む第１塗膜層が形成された絵付けシートを、第１塗膜層の乾燥温度および基体シートと補強シートの貼り合わせ時にかかる熱の温度のうち少なくとも一つが基体シートおよび補強シートの熱変質温度以上となる条件で製造する方法であって、
熱変質温度が上記乾燥温度および上記基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有する第１キャリアシートの上面に上記第１塗膜層を形成し、第１塗膜層の下面と上記基体シートの上面とを貼り合わせた後、第１キャリアシートを剥がし、第１塗膜層の上面と熱変質温度が上記乾燥温度および上記基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有する第２キャリアシートの下面とを間に上記補強シートを挟んで貼り合わせた後、第２キャリアシートを剥がすことを特徴とする絵付けシートの製造方法。
【請求項５】　前記第２キャリアシートと前記補強シートとを重ね合わせる前に、前記第２キャリアシートの下面に第２塗膜層を形成する請求項４記載の絵付けシートの製造方法。
【請求項６】　前記第１キャリアシートを剥がす前に、前記基体シートの下面に第２塗膜層を形成する請求項４または請求項５のいずれかに記載の絵付けシートの製造方法。
【請求項７】　前記基体シートと前記補強シートとを入れ替えて適用する請求項１～６のいずれかに記載の絵付けシートの製造方法。
【請求項８】　前記基体シートおよび前記補強シートの熱変質温度が、３５～１５０℃の範囲にある請求項１～６のいずれかに記載の絵付けシートの製造方法。
【請求項９】　前記基体シートおよび前記補強シートの熱変質温度が、６０～１５０℃の範囲にある請求項１～６のいずれかに記載の絵付けシートの製造方法。
【請求項１０】　前記請求項１～９のいずれかに記載の方法により製造された絵付けシートを、精密絵柄層の部分と立体加工型のこれに対応する部分との距離が３０ｍｍ以内になるように位置を合わせて立体加工型にセットし、基体シートの熱変質温度以上で立体加工することを特徴とする立体加工された絵付けシートの製造方法。
【請求項１１】　前記絵付けシートの絞り展開率が、１１０％以上である請求項１０記載の立体加工された絵付けシートの製造方法。
【請求項１２】　前記請求項１～１１のいずれかに記載の方法により得られた絵付けシートが、成形品表面の全部または一部分を被って接着されていることを特徴とする立体形状絵付け成形品。
【発明の詳細な説明】
【０００１】
【発明の属する技術の分野】本発明は、立体加工がしやすく、かつ絵柄パターンの一部に寸法変化許容率・位置精度許容公差が厳しい文字や記号などが存在する絵付けシートの製造方法および立体加工された絵付けシートの製造方法、立体形状絵付け成形品に関する。
【０００２】
【従来の技術】従来より、自動車内装部品、電話の筐体、電気製品の入力部品などの立体形状成形品の絵付けには、基体シートと補強シートの間に少なくとも絵柄層が形成された絵付けシートを用い、樹脂やその他の材質からなる成形品の表面に貼り付ける方法がある。また、上記絵付けシートを射出成形用金型内に配置して、成形樹脂を射出することにより成形と同時に樹脂成形品表面

に絵付けを行なう方法がある。補強シートの目的は、絵柄層を被覆して成形品表面に絵付けを行なうまで絵柄層を保護すること、および絵付けシートに腰を持たせて立体加工後から成形品表面に絵付けを行なうまでの間の形崩れを少なくすることである。

【０００３】なお、図６に示したような、絵柄パターンの一部に数字、文字、記号、直線、格子、図形など明確な表示部分を持つ部分（以下、精密絵柄パターン部９という）がある絵付けシートは、寸法安定性のよい二軸延伸ポリエステルフィルムなどからなる基体シートおよび補強シートを用いて作製していた。

【０００４】

【発明が解決しようとする課題】しかし、寸法安定性のよい二軸延伸ポリエステルフィルムからなる絵付けシートは、反面、伸びにくいため絞りの深い立体形状成形品には適用できなかった。なぜなら、絞りの深い立体形状成形品に絵付けを行なうには、絵付けシートの立体加工がしやすいシート材料を選択する必要があるからである。この場合、塗膜層の乾燥温度および基体シートと補強シートの貼り合わせ時にかかる熱の温度のうち少なくとも一つが基体シートおよび補強シートの熱変質温度以上となることが多く、その乾燥時および基体シートと補強シートの貼り合わせ時の熱と、基体シートや補強シートにかかる張力とによって基体シートや補強シートが伸び縮みして精密絵柄パターン部９の位置ズレ、歪みや寸法変化が生じやすい。

【０００５】したがって、本発明の目的は、上記の問題点を解決することにあり、絞りの深い立体形状加工に適した基体シートおよび補強シートを用い、これらの間に塗膜層を形成する際に、印刷や塗装後の乾燥熱によって精密絵柄パターン部の位置ズレ、歪み、寸法変化が生じず、基体シートと補強シートとを間に塗膜層を介して貼り合わせる時にかかる熱によっても精密絵柄パターン部の位置ズレ、歪み、寸法変化が生じない絵付けシートの製造方法、および立体加工された絵付けシートの製造方法、立体形状絵付け成形品を提供することにある。

【０００６】

【課題を解決するための手段】上記目的を達成するために、本発明の絵付けシートの製造方法は、熱変質温度（熱変質温度とは、ＪＩＳ Ｋ７１２７－１９８９の測定方法に基づいて基体シートおよび補強シートの引張試験を各環境温度下で実施したときのヤング率がそれぞれの２５℃の環境温度下でのヤング率の８０％以下になる境界の温度－以下同じ）が共に３５～１８０℃の範囲にある基体シートの上面と補強シートの下面とが貼り合わせられ且つその間にパターン寸法変化許容率３０％以内または位置精度許容公差±０．４mm以内の精密絵柄層を少なくとも含む第１塗膜層が形成された絵付けシートを、第１塗膜層の乾燥温度および基体シートと補強シートの貼り合わせ時にかかる熱の温度のうち少なくとも一つが基体シートおよび補強シートの熱変質温度以上となる条件で製造する方法であって、熱変質温度が上記乾燥温度および上記基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有するキャリアシートの上面と上記基体シートの下面とを貼り合わせ、基体シートの上面に上記第１塗膜層を形成し、第１塗膜層の上面と上記補強シートの下面とを貼り合わせた後、キャリアシートを剥がすように構成した。

【０００７】上記構成において、前記キャリアシートの上面と前記基体シートの下面とを貼り合わせる前に、前記キャリアシートの上面に第２塗膜層を形成するように構成した。

【０００８】また、上記構成において、前記キャリアシートを剥がす前に、前記補強シートの上面に第２塗膜層を形成するように構成した。

【０００９】また、本発明の別の絵付けシートの製造方法は、熱変質温度（熱変質温度とは、ＪＩＳ Ｋ７１２７－１９８９の測定方法に基づいて基体シートおよび補強シートの引張試験を各環境温度下で実施したときのヤング率がそれぞれの２５℃の環境温度下でのヤング率の８０％以下になる境界の温度－以下同じ）が共に３５～１８０℃の範囲にある基体シートの上面と補強シートの下面とが貼り合わせられ且つその間にパターン寸法変化許容率３０％以内または位置精度許容公差±０．４mm以内の精密絵柄層を少なくとも含む第１塗膜層が形成された絵付けシートを、第１塗膜層の乾燥温度および基体シートと補強シートの貼り合わせ時にかかる熱の温度のうち少なくとも一つが基体シートおよび補強シートの熱変質温度以上となる条件で製造する方法であって、熱変質温度が上記乾燥温度および上記基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有する第１キャリアシートの上面に上記第１塗膜層を形成し、第１塗膜層の下面と上記基体シートの上面とを貼り合わせた後、第１キャリアシートを剥がし、第１塗膜層の上面と熱変質温度が上記乾燥温度および上記基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有する第２キャリアシートの下面とを間に上記補強シートを挟んで貼り合わせた後、第２キャリアシートを剥がすこように構成した。

【００１０】上記構成において、前記第２キャリアシートと前記補強シートとを重ね合わせる前に、前記第２キャリアシートの下面に第２塗膜層を形成するように構成した。

【００１１】また、上記構成において、前記第１キャリアシートを剥がす前に、前記基体シートの下面に第２塗膜層を形成するように構成した。

【００１２】また、上記各構成において、前記基体シートと前記補強シートとを入れ替えて適用するように構成した。

【００１３】また、上記各構成において、前記基体シー

トおよび前記補強シートの熱変質温度が、３５～１５０℃の範囲にあるように構成した。

【００１４】また、上記各構成において、前記基体シートおよび前記補強シートの熱変質温度が、６０～１５０℃の範囲にあるように構成した。

【００１５】本発明の立体加工された絵付けシートの製造方法は、前記方法により製造された絵付けシートを、精密絵柄層の部分と立体加工型のこれに対応する部分との距離が３０ｍｍ以内になるように位置を合わせて立体加工型にセットし、基体シートの熱変質温度以上で立体加工するように構成した。

【００１６】上記構成において、前記絵付けシートの絞り展開率が、１１０％以上であるように構成した。

【００１７】本発明の立体形状絵付け成形品は、前記方法により得られた絵付けシートが、成形品表面の全部または一部分を被って接着されているように構成した。

【００１８】

【発明の実施の形態】以下、図面を参照しながら本発明をさらに詳しく説明する。なお、明細書において「上面」「下面」の表現を用いているが、これは、図面に開示した方向性に従っている。したがって、図面の上下を逆転した場合には、「上面」と「下面」が逆転する。図１および図４は本発明に係る絵付けシートを製造する方法の一実施例を示す断面図、図２および図３は本発明に係る絵付けシートの一実施例を示す断面図、図５は本発明に係る絵付けシートに形成される絵柄パターンの一実施例を示す平面図、図６は本発明に係る絵付けシートを立体加工する方法の一実施例を示す断面図、図７は本発明に係る立体形状絵付け成形品の一実施例を示す斜視図、図８は本発明に係る絵付けシート絞り展開率を説明する図である。図中、１は基体シート、２は第１塗膜層、２ａは精密絵柄層、３は補強シート、４はキャリアシート、５は印刷版、６は乾燥、７は第１キャリアシート、８は第２キャリアシート、９は精密絵柄パターン部、１０は位置合わせ用パターン部、１１は木目絵柄パターン部、１２は立体加工型、１３は絵付けシート、１４は熱ラミネーター、１５は第２塗膜層、S_1 は立体形状絵付け成形品の絵付けシートの表面積、S_2 は投影面積をそれぞれ示す。

【００１９】本発明では、ともに立体形状加工に適する基体シートの上面と補強シートの下面とが貼り合わせられ且つその間に数字、文字、記号、直線、格子、図形など明確な表示パターンの精密絵柄層を少なくとも含む第１塗膜層が形成された絵付けシートを、第１塗膜層の乾燥温度および基体シートと補強シートの貼り合わせ時にかかる熱の温度のうち少なくとも一つが基体シートおよび補強シートの熱変質温度以上となる条件で製造する方法において、第１塗膜層の乾燥および基体シートと補強シートの貼り合わせを寸法安定性の良いキャリアシート上で行なうことにより、絵付けシートに製造に係る前記の問題を解決した。

【００２０】具体的には、例えば図１に示すように、寸法安定性が良く離型性を有するキャリアシート４の上面と立体形状加工に適する基体シート１の下面とを貼り合わせ、基体シート１上面に上記数字、文字、記号、直線、格子、図形など明確な表示パターンの精密絵柄層２ａを少なくとも含む第１塗膜層２を形成した後（図１中ア参照）、第１塗膜層２の上面と立体形状加工に適する補強シート３の下面とを貼り合わせた後（図１中イ参照）、キャリアシート４を剥がすことにより絵付けシートを製造する（図１中ウ参照）。寸法安定性の良いキャリアシート４によって補強されている立体形状加工に適する基体シート１および補強シート３は（１）第１塗膜層２の乾燥時の加熱によっても、（２）補強シート３との貼り合わせ時の加熱によっても寸法変化が少ないため、基体シート１と補強シート３との間に挟まれた精密絵柄層２ａの絵柄パターンも位置ズレ、パターンの歪み、寸法変化が少ない。このこの精密絵柄層２ａはキャリアシート４の剥離によっても変わらないから、絵付けシートの精密絵柄パターン部９は位置ズレ、パターンの歪み、寸法変化のないものである。

【００２１】ただし、上記の方法で効果があるのは、立体形状加工に適する基体シート１および補強シート３として熱変質温度が３５～１８０℃の範囲にあるシート材を用いた場合だけであり、基体シート１および補強シート３の熱変質温度が３５℃より低ければそのシート自身が外気温によって溶融し厚みが不均一になって絵付けが安定してできなくなるため不具合があり、１８０℃より高ければ絵付けシートを所定の形状に立体加工しにくいことが本発明者の実験によりわかっている。ここで熱変質温度とは、ＪＩＳ Ｋ７１２７－１９８９の測定方法に基づいて基体シート１および補強シート３の引張試験を各環境温度下で実施したときのヤング率がそれぞれの２５℃の環境温度下でのヤング率の８０％以下になる境界の温度を示す。なお、引張試験は、幅１０ｍｍの基体シートの試験片を一対のチャックを用いてチャック間距離５ｍｍで固定し試験片の一端を５００ｍｍ／分の一定速度で２０ｇｆの荷重をかけて実施する。本発明の基体シート１および補強シート３の材質としては、塩化ビニルフィルム、ポリカーボネートフィルム、アクリロニトリル・ブタジエン・スチレンフィルム、ポリスチレンフィルム、未延伸ポリビニルアルコール、低結晶性ポリプロピレンフィルム、ポリエステル共重合フィルム、アモルファスポリエチレンテレフタレートフィルム、ポリブチレンテレフタレートフィルムなどを用いることができる。

【００２２】また、寸法安定性の良いキャリアシート４としては、二軸延伸ポリエステルフィルム、二軸延伸ポリプロピレンフィルム、トリアセテートフィルム、二軸延伸エチレンビニルアルコールフィルム、ポリイミドフ

ィルムなどがあるが、（１）第１塗膜層２の乾燥温度、（２）基体シート１と補強シート３との貼り合わせ時において加わる熱の温度のうち少なくとも一つを基体シート１および補強シート３の熱変質温度以上とすることから、熱変質温度が上記乾燥温度および上記基体シートと補強シート３の貼り合わせ時にかかる熱の温度よりも高いであるものに限定される。なお、これらのキャリアシート４の剥離面は、離型層を形成するなどの離型処理が施されることにより、離型性を有している。キャリアシート４と上記基体シート、さらに上記補強シート３との貼り合わせ手段としては、熱ラミネート法（図中１４は熱ラミネーター）やドライラミネート法等がある。

【００２３】また、上記方法で効果があるのは、パターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層２ａを形成する場合だけであり、これよりパターン寸法変化許容率または位置精度許容公差が大きい絵柄パターンの絵柄層を形成する場合は、キャリアシート４なしで製造した場合と目視外観上、ほとんど差がないことが本発明者の実験によりわかっている。ここで、パターン変化許容率が３０％以内の絵柄パターンとは、パターンの縦方向または横方向のいずれかの寸法を、３０％を超えて拡大または縮小させた場合に、歪み等の不具合が目視で明確にわかる絵柄パターンのことであり、数字・文字・記号などがこれに該当する。また、位置精度許容公差が±０．４ｍｍ以内の絵柄パターンとは、各々の絵柄パターンの色差ΔＥが４以上である組合せが一つ以上存在する複数層からなり、具体的には、縦方向または横方向のいずれかの方向、±０．４ｍｍを超えて少なくとも一つのパターンの位置がずれた場合に、明らかに目視で位置ズレがわかり、それが絵付成形品になった場合に使用上差し支えのある重ね刷り印刷パターンがこれに該当する。上記精密絵柄層２ａは、顔料と樹脂バインダーから構成される顔料インキ層、パール顔料と樹脂バインダーから構成される光輝性顔料層、染料と樹脂バインダーから構成される染料インキ層の群から選ばれる少なくとも一層によって構成される。また、上記精密絵柄層２ａを少なくとも含む第１塗膜層２は、汎用の印刷手段（グラビア、オフセット、スクリーン）の他、ロールコート、リバースコート、リップコートなどで形成する。これらの手段により印刷または塗装されたインキ被膜は、熱風あるいは遠赤外線によってインキ中に含まれる溶剤等を飛散させ、インキ被膜表面のベタつきがなくなるまで乾燥させる。

【００２４】なお、上記方法において、前記キャリアシート４の上面と前記基体シート１の下面とを貼り合わせる前に、前記キャリアシート４の上面に第２塗膜層１５を形成する（図２参照）こともできる。この場合、第２塗膜層１５は、パターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層を含む層に限定されない。

【００２５】また、上記方法において、前記キャリアシート４を剥がす前に、前記補強シート３の上面に第２塗膜層１５を形成する（図３参照）こともできる。この場合、第２塗膜層１５は、パターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層を含む層に限定されない。

【００２６】また、熱変質温度が３５～１８０℃の範囲にある基体シートにパターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層２ａを少なくとも含む第１塗膜層２を直接形成しない方法もある。例えば図４に示すように、熱変質温度が上記乾燥温度および上記基体シート１と補強シート３の貼り合わせ時にかかる熱の温度よりも高く離型性を有する第１キャリアシート７の上面に上記第１塗膜層２を形成し（図４中ア参照）、第１塗膜層２の下面と上記基体シート１の上面とを貼り合わせた後（図４中イ参照）、第１キャリアシート７を剥がし（図４中ウ参照）、熱変質温度が上記乾燥温度および上記基体シート１と補強シート３の貼り合わせ時にかかる熱の温度よりも高く離型性を有する第２キャリアシート８の下面と第１塗膜層２の上面とを間に上記補強シート３を挟んで貼り合わせた後（図４中エ参照）、第２キャリアシート８を剥がす（図４中オ参照）ことにより絵付けシートを製造する。熱変質温度が上記乾燥温度および上記基体シート１と補強シート３の貼り合わせ時にかかる熱の温度よりも高い第１キャリアシート７および第２キャリアシート８は（１）第１塗膜層２の乾燥時の加熱によっても、（２）基体シート１と補強シート３との貼り付け時の加熱によっても寸法変化が少ないものである。そのため、基体シート１および補強シート３の寸法変化を抑えることができ、基体シート１と補強シート３との間に挟まれた精密絵柄層２ａの絵柄パターンも位置ズレ、パターンの歪み、寸法変化が少ない。この精密絵柄層２ａは第１キャリアシート７および第２キャリアシート８の剥離によっても変わらないから、絵付けシートの精密絵柄パターン部９は位置ズレ、パターンの歪み、寸法変化のないものである。

【００２７】なお、上記第２キャリアシート８を用いる方法において、前記第２キャリアシート８と前記補強シート３とを重ね合わせる前に、前記第２キャリアシート８の下面に第２塗膜層１５を形成する（図３参照）こともできる。この場合、第２塗膜層１５は、パターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層２ａを含む層に限定されない。

【００２８】また、上記第２キャリアシート８を用いる方法において、前記第１キャリアシート７を剥がす前に、前記基体シート１の下面に第２塗膜層１５を形成する（図２参照）こともできる。この場合、第２塗膜層１５は、パターン寸法変化許容率３０％以内または位置精

度許容公差±０．４ｍｍ以内のパターンの精密絵柄層２ａを含む層に限定されない。

【００２９】また、本発明は、以上の絵付けシートの製造方法において基体シート１と補強シート３とを入れ替えて適用してもよい。

【００３０】また、絵付けシートの使用用途によっては、立体形状加工に適する基体シート１および補強シート３を熱変質温度がより狭い範囲にあるシート材から選択するのが好ましい。たとえば、家電用途では、極めて深い立体加工性が重要視されるため、熱変質温度が３５～１５０℃の材質を選定しなければ上記絵付けシートの製造方法によっても効果が得られにくい。また、自動車内装部品用途では、より優れた耐熱性と極めて深い立体加工性の両方とも要求されるので熱変質温度が６０～１５０℃の材質を選定しなければ、上記絵付けシートの製造方法によっても効果を得ることが難しい。

【００３１】本発明に係る絵付けシートは、パターン変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内の精密絵柄パターン部９を構成する精密絵柄層２ａの他に、位置合せ用パターン部１０を構成する絵柄層が形成されていてもよいし、木目、石目、大理石などの抽象柄パターンの中から選ばれる絵柄パターン部（木目の場合は木目絵柄パターン部１１）を構成する絵柄層が形成されてもよい（図５参照）。位置合わせして立体加工する際に、位置合わせ用パターン部１０を光電管で読み取るなどの方式にすることにより生産性が大幅に向上する。

【００３２】本発明の立体形状絵付け成形品（図７参照）は、以上の方法により得られた絵付けシートが、成形品表面の全部または一部分を被って接着されているので、精密絵柄パターン部９の位置ズレ、パターンの歪み、寸法変化が少ない。前記絵付けシートを用いた成形品表面への絵付け方法としては、絵付けシートに粘着剤をコートして貼り付けたり、ホットメルト剤をコートして熱プレス貼着したり、成形同時絵付けしたりする方法などがある。成形品の材質としては、上記すべての方法において、アクリロニトリルブタジエンスチレン、ポリカーボネート、ポリプロピレン、ポリメタクリル酸メチル、アクリロニトリル・スチレン，ポリスチレン、ポリエチレンテレフタレート、ポリアミド、熱可塑性エラストマー、ポリウレタン等（アロイを含む）の樹脂を用いることができる。また、成形同時絵付けの場合以外には、上記樹脂に限定されず、樹脂以外の材質、たとえば木質材料なども用いることができる。

【００３３】なお、上記絵付けシートを用いて成形品表面への絵付けを行なうに際しては、絵付けシートを成形品の立体形状に応じて基体シート１および補強シート３の熱変質温度以上で立体加工しておく必要があるが、このとき、とくに絵付けシートの絞り展開率が１１０％以上である場合には、絵付けシートをパターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層２ａの部分と立体加工型１２のこれに対応する部分との距離が３０ｍｍ以内になるように位置を合わせて立体加工型１２にセットするのが好ましい（図６参照）。なぜなら、精密絵柄層２ａの部分と立体加工型１２のこれに対応する部分との距離が広く離れた状態で絵付けシートの立体加工を行なうと、絵付けシートが上記精密絵柄層２ａの部分において立体加工型１２に接触するまでに、絵付けシートが大きく伸びてしまい、精密絵柄パターン部９の位置ズレ、パターンの歪み、寸法変化を生ずるからである。前記したように精密絵柄層２ａの部分と立体加工型１２のこれに対応する部分との距離が３０ｍｍ以内であれば、絵付けシートが伸びる前の状態又は絵付けシートの伸びがまだ少ない状態で上記精密絵柄層２ａの部分が立体加工型１２に接触し、その形状に沿うため、精密絵柄パターン部９の位置ズレ、パターンの歪み、寸法変化を少なくすることができる。上記距離が３０ｍｍを超えると、精密絵柄パターン部９の位置ズレ、パターンの歪み、寸法変化を抑えるのは難しくなる。また、より好ましいのは上記距離が２０ｍｍ以内になるようにセットすることである。立体加工方法としては、真空成形、圧空成形、熱プレス、水圧プレスなどを用いることができる。また、上記絞り展開率とは、立体形状絵付け成形品の絵付けシートの表面積S_1をそれを真上から見た場合の投影面積S_2（立体加工する前の絵付けシートの表面積に相当）で割った値の百分率で示したものである（図８参照）。

【００３４】

【実施例】（実施例１）下記キャリアシートの上面に下記絵柄層ａをグラビア印刷にて形成し、その絵柄層ａの上面と下記基体シートの下面とをポリウレタン粘着剤層を介しての貼り合わせ、さらに基体シートの上面に下記絵柄層ｂおよび下記絵柄層ｃをグラビア印刷にて形成し、その上に下記絵柄層ｄおよび下記接着層をスクリーン印刷にて順次形成し、さらにその上に補強シートを貼り付けた後、キャリアシートを剥がすことによって絵付けシートを得た。なお、各印刷後の乾燥条件は５０℃とした。基体シートと補強シートの貼り合わせ時に加熱条件は７０℃とした。

キャリアシート：　二軸延伸ポリエステルフィルム２５μｍ
　熱変質温度　２０５℃

絵柄層ａ：　全面マット
　アクリル系樹脂
　シリカ粒子

基体シート：　ポリスチレンフィルム１００μｍ
　熱変質温度　７０℃
絵柄層ｂ：　位置合わせ用パターン部
　アクリル系樹脂
　着色剤　１色（黒）
絵柄層ｃ：　石目絵柄パターン部
　ビニル系樹脂
　着色剤　３色（白、藍、灰）
絵柄層ｄ：　照光文字精密絵柄パターン部
　（パターン寸法変化許容率最大１０％，位置精度許容
　公差±０．２０ｍｍ）
　ビニル系樹脂
　着色剤　４色（照光文字部：黄、青、赤、遮蔽部：黒）
接着層：　ビニル系樹脂
補強シート：　ポリスチレンフィルム２００μｍ
　熱変質温度　７０℃

【００３５】この絵付けシートを立体加工型に絵柄層ｄの部分と立体加工型のこれに対応する部分部分との距離が一番離れているところで２０ｍｍになるように位置を合わせてセットし、基体シートおよび補強シートの熱変質温度以上に加熱した状態で真空吸引して絵付けシートを絞り展開率１６０％に立体加工した。

【００３６】次に立体加工された絵付けシートの外周および孔部をレーザーでトリミング加工した後、射出成形用金型の中に挿入し、透明ポリスチレン樹脂を射出することにより、成形と同時に絵付して石目・照光文字携帯電話筐体を得た。この石目・照光文字携帯電話筐体は、成形品表面を被って接着されている絵付けシートについて精密絵柄パターン部の位置ズレ、パターンの歪み、寸法変化の少ないものであった。

【００３７】（実施例２）下記第１キャリアシートの上面に下記の剥離層および絵柄層ａをグラビア印刷にて順次形成し、その上に下記の絵柄層ｂおよび接着層をスクリーン印刷にて形成した後、接着層の下面と基体シートの上面とを貼り合わせた後、第１キャリアシートを剥がした。また、下記第２キャリアシートの片面に剥離層および絵柄層ｃをグラビア印刷にて順次形成した。次いで、上記基体シートのキャリアシートを剥離した面に、印刷層の形成された第２キャリアシートを間に下記補強シートを挟んで貼り合わせ、第２キャリアシートを剥がす剥がすことによって絵付けシートを得た。なお、各印刷後の乾燥条件は８０℃とした。基体シートと補強シートの貼り合わせ時に加熱条件は１００℃とした。

第一キャリアシート：離型処理済み二軸延伸ポリエステルフィルム２５μｍ
　熱変質温度　２０５℃
剥離層：　アクリル系樹脂
絵柄層ａ：　木目絵柄パターン部
　アクリル系樹脂
　着色剤　２色（黄、茶）
絵柄層ｂ：　照光文字精密絵柄パターン部
　（パターン寸法変化許容率最大３０％、位置精度許容
　公差±０．３０ｍｍ）
　アクリル系樹脂
　着色剤　５色（照光文字部：黄、青、赤　、緑、
　遮蔽部：黒）
接着層：　ビニル系樹脂
基体シート：　アクリルフィルム５０μｍ
　熱変質温度　６５℃
第二キャリアシート：離型処理済み二軸延伸ポリエステルフィルム２５μｍ
　熱変質温度　１５０℃
剥離層：　アクリル系樹脂
絵柄層ｃ：　マット柄パターン部
　シリカ入りアクリル系樹脂

補強シート：　　ポリカーボネートフィルム２５０μｍ
熱変質温度　７７℃

【００３８】この絵付けシートを射出成形金型の一部を兼ねる立体加工型に絵柄層ｂの部分と立体加工型のこれに対応する部分との距離が一番離れているところで１２ｍｍになるように位置を合わせてセットし、基体シートおよび補強シートの熱変質温度以上に加熱した状態で真空吸引して絵付けシートを絞り展開率１８０％に立体加工した。

【００３９】次に立体加工された絵付けシートをそのまま保持し、射出成型金型を閉じてポリカーボネート樹脂を射出し、成型と同時に絵付けし、成型品を金型から取り出した後にレーザー照射により絵付けシートの外周および孔部の不要な部分をトリミング除去して木目・照光文字併用自動車内装部品を得た。この木目・照光文字併用自動車内装部品は、成形品表面を被って接着されている絵付けシートについて精密絵柄パターン部の位置ズレ、パターンの歪み、寸法変化の少ないものであった。

【００４０】

【発明の効果】本発明の絵付けシートの製造方法および立体加工された絵付けシートの製造方法、立体形状絵付け成形品は、以上のとおりの構成を有するので、次のような優れた効果を有する。

【００４１】すなわち、本発明の絵付けシートを製造方法は、離型性を有し寸法安定性の良いキャリアシートの上面と上記基体シートの下面とを貼り合わせ、基体シートの上面にパターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層を少なくとも含む第１塗膜層を形成し、第１塗膜層の上面と上記補強シートの下面とを貼り合わせた後、キャリアシートを剥がすことにより絵付けシートを製造する。あるいは、離型性を有し寸法安定性の良いキャリアシートの上面にパターン寸法変化許容率３０％以内または位置精度許容公差±０．４ｍｍ以内のパターンの精密絵柄層を少なくとも含む第１塗膜層を形成し、第１塗膜層の下面と上記基体シートの上面とを貼り合わせた後、第１キャリアシートを剥がし、第１塗膜層の上面と熱変質温度が上記乾燥温度および上記基体シートと補強シートの貼り合わせ時にかかる熱の温度よりも高く離型性を有する第２キャリアシートの下面とを間に上記補強シートを挟んで貼り合わせた後、第２キャリアシートを剥がすにより絵付けシートを製造する。なお、基体シートと補強シートとは入れ替えて適用してもよい。

【００４２】したがって、寸法安定性の良いキャリアシートによって補強されている立体形状加工に適する基体シートおよび補強シートは塗膜層の乾燥時の加熱によっても、基体シートと補強シートとの貼り付け時の加熱によっても寸法変化は少ないため、基体シートと補強シートとの間に形成された精密絵柄層の絵柄パターンも位置ズレ、パターンの歪み、寸法変化が少ない。この精密絵柄層はキャリアシートの剥離によっても変わらないから、絵付けシートの絵柄パターンは位置ズレ、パターンの歪み、寸法変化のないものである。

【図面の簡単な説明】

【図１】本発明に係る絵付けシートを製造する方法の一実施例を示す断面図である。

【図２】本発明に係る絵付けシートの一実施例を示す断面図である。

【図３】本発明に係る絵付けシートの一実施例を示す断面図である。

【図４】本発明に係る絵付けシートを製造する方法の一実施例を示す断面図である。

【図５】本発明に係る絵付けシートに形成される絵柄パターンの一実施例を示す平面図である。

【図６】本発明に係る絵付けシートを立体加工する方法の一実施例を示す断面図である。

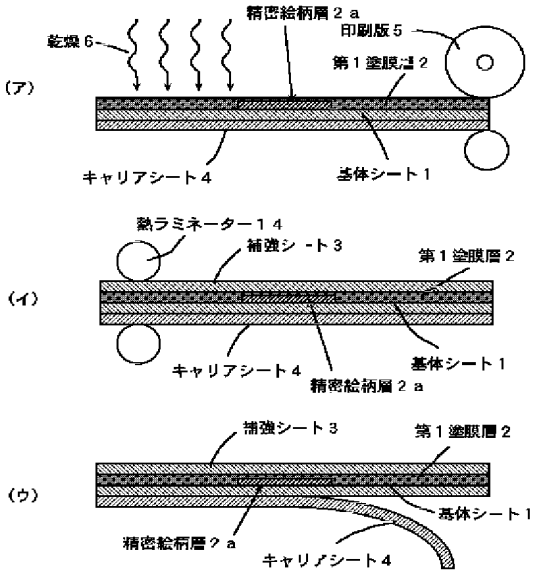
【図７】本発明に係る立体形状絵付け成形品の一実施例を示す斜視図である。

【図８】本発明に係る絵付けシート絞り展開率を説明する図である。

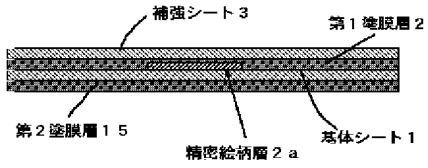
【符号の説明】

１　基体シート
２　第１塗膜層
２ａ　精密絵柄層
３　補強シート
４　キャリアシート
５　印刷版
６　乾燥
７　第１キャリアシート
８　第２キャリアシート
９　精密絵柄パターン部
１０　位置合わせ用パターン部
１１　木目絵柄パターン部
１２　立体加工型
１３　絵付けシート
１４　熱ラミネーター
１５　第２塗膜層
S_1　立体形状絵付け成形品の絵付けシートの表面積
S_2　投影面積

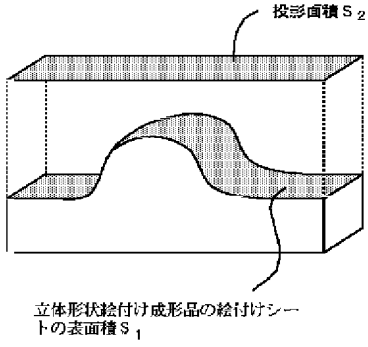
【図1】


(ア)
乾燥6
精密絵柄層2a
印刷版5
第1塗膜層2
キャリアシート4
基体シート1
(イ)
熱ラミネーター14
補強シート3
第1塗膜層2
キャリアシート4
精密絵柄層2a
基体シート1
(ウ)
補強シート3
第1塗膜層2
基体シート1
精密絵柄層2a
キャリアシート4

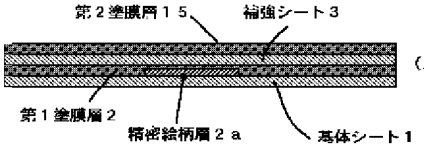
【図2】


補強シート3
第1塗膜層2
第2塗膜層15
精密絵柄層2a
基体シート1

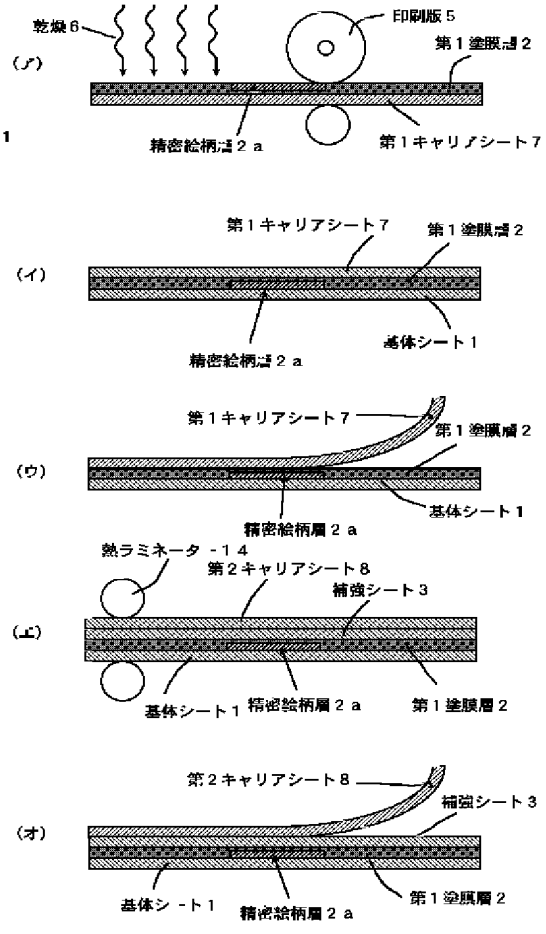
【図8】


投影面積S2
立体形状絵付け成形品の絵付けシートの表面積S1

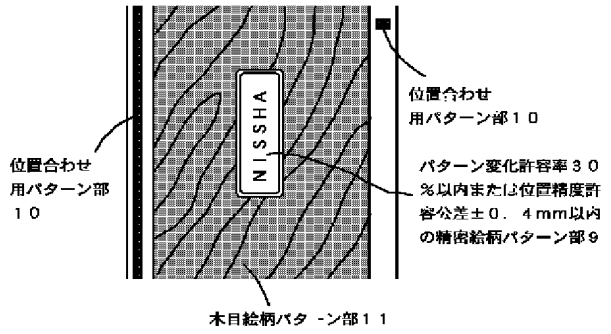
【図3】


第2塗膜層15
補強シート3
第1塗膜層2
精密絵柄層2a
基体シート1

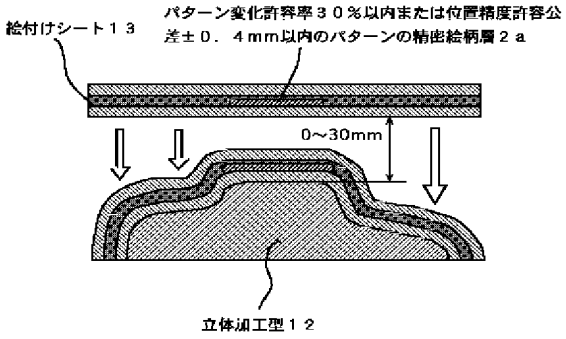
【図4】


(ア)
乾燥6
印刷版5
第1塗膜層2
精密絵柄層2a
第1キャリアシート7
(イ)
第1キャリアシート7
第1塗膜層2
精密絵柄層2a
基体シート1
(ウ)
第1キャリアシート7
第1塗膜層2
精密絵柄層2a
基体シート1
(エ)
熱ラミネーター14
第2キャリアシート8
補強シート3
基体シート1
精密絵柄層2a
第1塗膜層2
(オ)
第2キャリアシート8
補強シート3
基体シート1
精密絵柄層2a
第1塗膜層2

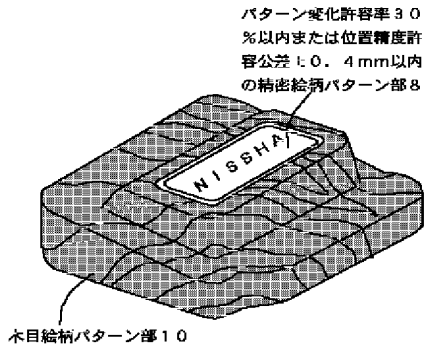
【図５】



【図６】



【図７】



フロントページの続き

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FG08Y GA04 GB01
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AK51G AR00A AR00D BA03
BA04 BA07 BA10A BA10D
CB00 CC00B CC00C EH132
EH462 EJ422 EJ912 GB90
HB00B HB00C HB31B HB31C
JJ10A JJ10D JK07A JK07D
YY00A YY00B YY00D

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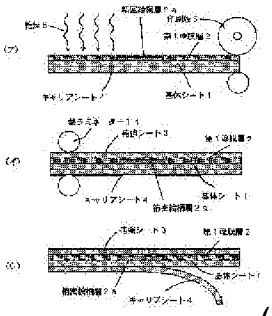
(72)Inventor : MORI FUJIO

(54) METHOD FOR MANUFACTURING PATTERNED SHEET, METHOD FOR MANUFACTURING THREE-DIMENSIONALLY PROCESSED PATTERNED SHEET AND THREEDIMENSIONAL PATTERNED MOLDED ARTICLE



(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for manufacturing a patterned sheet using a substrate sheet suitable for deep draw three-dimensional processing and a reinforcing sheet and not generating the positional shift, strain and dimensional change of a precise pattern after printing or coating when a coating film layer is formed between both sheets.

SOLUTION: The upper surface of a carrier sheet of which the thermal deterioration temperature is higher than drying temperature and the temperature of the heat applied when the substrate sheet and the reinforcing sheet are laminated and which has releasability, and the lower surface of the substrate sheet are laminated. A first coating film layer is formed on the upper surface of the substrate sheet, and the upper surface of the first coating film layer and the lower surface of the reinforcing sheet are laminated before the carrier sheet is peeled.

LEGAL STATUS

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[Date of registration]	
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[Date of extinction of right]

* NOTICES *

CLAIMS

[Claim(s)]

[Claim 1] Thermal metamorphism temperature (with thermal metamorphism temperature) When the tension test of a base sheet and a reinforcement sheet is carried out under each environmental temperature based on the measuring method of JIS K 7127-1989 The top face of the base sheet in the range which is both 35-180 degrees C, and the underside of a reinforcement sheet are stuck. below temperature - of the boundary where ** Young's modulus turns into 80% or less of the Young's modulus under each environmental temperature which is 25 degrees C -- being the same -- in the meantime The muffle-painting sheet with which the 1st coat which contains the precision pattern layer of less than 30% of rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance at least was formed It is the approach of manufacturing on the conditions from which at least one of the temperature of the heat which starts at the time of the drying temperature of the 1st coat and the lamination of a base sheet and a reinforcement sheet becomes beyond the thermal metamorphism temperature of a base sheet and a reinforcement sheet. Thermal metamorphism temperature the top face of a carrier sheet and the underside of the above-mentioned base sheet which have a mold-release characteristic more highly than the temperature of the heat which starts at the

time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet, and a reinforcement sheet Lamination, The manufacture approach of the muffle-painting sheet characterized by removing a carrier sheet after forming the 1st coat of the above in the top face of a base sheet and sticking the top face of the 1st coat, and the underside of the above-mentioned reinforcement sheet.

[Claim 2] The manufacture approach of the muffle-painting sheet according to claim 1 which forms the 2nd coat in the top face of said carrier sheet before sticking the top face of said carrier sheet, and the underside of said base sheet.

[Claim 3] The manufacture approach of a muffle-painting sheet given in either claim 1 which forms the 2nd coat in the top face of said reinforcement sheet before removing said carrier sheet, or claim 2.

[Claim 4] Thermal metamorphism temperature (with thermal metamorphism temperature) When the tension test of a base sheet and a reinforcement sheet is carried out under each environmental temperature based on the measuring method of JIS K 7127-1989 The top face of the base sheet in the range which is both 35-180 degrees C, and the underside of a reinforcement sheet are stuck. below temperature - of the boundary where ** Young's modulus turns into 80% or less of the Young's modulus under each environmental temperature which is 25 degrees C -- being the same -- in the meantime The muffle-painting sheet with which the 1st coat which contains the precision pattern layer of less than 30% of rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance at least was formed It is the approach of manufacturing on the conditions from which at least one of the temperature of the heat which starts at the time of the drying temperature of the 1st coat and the lamination of a base sheet and a reinforcement sheet becomes beyond the thermal metamorphism temperature of a base sheet and a reinforcement sheet. Thermal metamorphism temperature forms the 1st coat of the above in the top face of the 1st carrier sheet which has a mold-release characteristic more highly than the temperature of the heat which starts at the time of the lamination of the

above-mentioned drying temperature and the above-mentioned base sheet, and a reinforcement sheet. After sticking the underside of the 1st coat, and the top face of the above-mentioned base sheet, the 1st carrier sheet is removed. After sticking in between the top face of the 1st coat, and the underside of the 2nd carrier sheet which has a mold-release characteristic more highly than the temperature of the heat which requires thermal metamorphism temperature at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet, and a reinforcement sheet on both sides of the above-mentioned reinforcement sheet, The manufacture approach of the muffle-painting sheet characterized by removing the 2nd carrier sheet.

[Claim 5] The manufacture approach of the muffle-painting sheet according to claim 4 which forms the 2nd coat in the underside of said 2nd carrier sheet before piling up said 2nd carrier sheet and said reinforcement sheet.

[Claim 6] The manufacture approach of a muffle-painting sheet given in either claim 4 which forms the 2nd coat in the underside of said base sheet before removing said 1st carrier sheet, or claim 5.

[Claim 7] The manufacture approach of the muffle-painting sheet according to claim 1 to 6 which replaces and applies said base sheet and said reinforcement sheet.

[Claim 8] The manufacture approach of the muffle-painting sheet according to claim 1 to 6 which has the thermal metamorphism temperature of said base sheet and said reinforcement sheet in the range of 35-150 degrees C.

[Claim 9] The manufacture approach of the muffle-painting sheet according to claim 1 to 6 which has the thermal metamorphism temperature of said base sheet and said reinforcement sheet in the range of 60-150 degrees C.

[Claim 10] The manufacture approach of the muffle-painting sheet which is characterized by doubling a location, setting to a solid processing mold so that the distance of the part of a precision pattern layer and the part corresponding to this of a solid processing mold may be set to less than 30mm in the muffle-painting sheet manufactured by said approach according to claim 1 to 9, and

carrying out solid processing above the thermal metamorphism temperature of a base sheet and by which solid processing was carried out.

[Claim 11] The manufacture approach of the muffle-painting sheet according to claim 10 by which solid processing was carried out that the rate of drawing expansion of said muffle-painting sheet is 110% or more.

[Claim 12] Solid configuration muffle-painting mold goods with which the muffle-painting sheet obtained by said approach according to claim 1 to 11 is characterized by having worn all or some of mold-goods front faces, and having pasted up.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The field of the technique in which invention belongs] This invention relates to the manufacture approach of a muffle-painting sheet that are easy to carry out solid processing, and an alphabetic character, a notation, etc. with severe rate of dimensional change allowance and location precision allowable tolerance exist in some pattern patterns and the manufacture approach of the muffle-painting sheet

by which solid processing was carried out, and solid configuration muffle-painting mold goods.

[0002]

[Description of the Prior Art] Conventionally, there is the approach of sticking on the front face of the mold goods which consist of construction material of resin or others in muffle painting of solid configuration mold goods, such as an automobile interior part, a case of a telephone, and input components of an electric product, using the muffle-painting sheet with which the pattern layer was formed at least between the base sheet and the reinforcement sheet. Moreover, the above-mentioned muffle-painting sheet is arranged in a injection molding die, and the approach of painting on a resin mold-goods front face is in shaping and coincidence by injecting shaping resin. The object of a reinforcement sheet is protecting a pattern layer and lessening form collapse until it gives the waist to a muffle-painting sheet and paints on a mold-goods front face after solid processing until they cover a pattern layer and paints on a mold-goods front face.

[0003] In addition, the muffle-painting sheet with the part (henceforth the precision pattern pattern section 9) which has a part for clear displays, such as a figure, an alphabetic character, a notation, a straight line, a grid, and a graphic form, in some pattern patterns as shown in drawing 6 was produced using the base sheet and reinforcement sheet which consist of biaxial-stretching polyester film with sufficient dimensional stability etc.

[0004]

[Problem(s) to be Solved by the Invention] However, on the other hand, for the pile reason, the muffle-painting sheet which consists of biaxial-stretching polyester film with sufficient dimensional stability was inapplicable to elongation at the deep solid configuration mold goods of drawing. In order to paint to the deep solid configuration mold goods of drawing, it is because it is necessary to choose the sheet material which solid processing of a muffle-painting sheet tends to carry out. In this case, at least one of the temperature of the heat which starts at the time of the drying temperature of a coat and the lamination of a base sheet

and a reinforcement sheet becomes beyond the thermal metamorphism temperature of a base sheet and a reinforcement sheet in many cases. A base sheet and a reinforcement sheet expand and contract and it is easy to produce location gap of the precision pattern pattern section 9, distortion, and a dimensional change with the heat at the time of the desiccation and the lamination of a base sheet and a reinforcement sheet, and the tension concerning a base sheet or a reinforcement sheet.

[0005] Therefore, the object of this invention is to solve the above-mentioned trouble. The base sheet and reinforcement sheet suitable for deep solid configuration processing of drawing are used. In case a coat is formed among these, with the desiccation heat after printing or paint Location gap of the precision pattern pattern section, Also with the heat which starts when distortion and a dimensional change do not arise but a base sheet and a reinforcement sheet are stuck through a coat in between, location gap of the precision pattern pattern section, It is in offering distortion, the manufacture approach of the muffle-painting sheet which a dimensional change does not produce and the manufacture approach of the muffle-painting sheet by which solid processing was carried out, and solid configuration muffle-painting mold goods.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned object, the manufacture approach of the muffle-painting sheet of this invention Thermal metamorphism temperature (with thermal metamorphism temperature) When the tension test of a base sheet and a reinforcement sheet is carried out under each environmental temperature based on the measuring method of JIS K 7127-1989 The top face of the base sheet in the range which is both 35-180 degrees C, and the underside of a reinforcement sheet are stuck. below temperature - of the boundary where ** Young's modulus turns into 80% or less of the Young's modulus under each environmental temperature which is 25 degrees C -- being the same -- in the meantime The muffle-painting sheet with which the 1st coat which contains the precision pattern layer of less than 30% of rates of pattern

dimensional change allowance and less than **0.4mm of location precision allowable tolerance at least was formed It is the approach of manufacturing on the conditions from which at least one of the temperature of the heat which starts at the time of the drying temperature of the 1st coat and the lamination of a base sheet and a reinforcement sheet becomes beyond the thermal metamorphism temperature of a base sheet and a reinforcement sheet. Thermal metamorphism temperature the top face of a carrier sheet and the underside of the above-mentioned base sheet which have a mold-release characteristic more highly than the temperature of the heat which starts at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet, and a reinforcement sheet Lamination, After forming the 1st coat of the above in the top face of a base sheet and sticking the top face of the 1st coat, and the underside of the above-mentioned reinforcement sheet, it constituted so that a carrier sheet might be removed.

[0007] In the above-mentioned configuration, before sticking the top face of said carrier sheet, and the underside of said base sheet, it constituted so that the 2nd coat might be formed in the top face of said carrier sheet.

[0008] Moreover, in the above-mentioned configuration, before removing said carrier sheet, it constituted so that the 2nd coat might be formed in the top face of said reinforcement sheet.

[0009] Moreover, the manufacture approach of another muffle-painting sheet of this invention Thermal metamorphism temperature (with thermal metamorphism temperature) When the tension test of a base sheet and a reinforcement sheet is carried out under each environmental temperature based on the measuring method of JIS K 7127-1989 The top face of the base sheet in the range which is both 35-180 degrees C, and the underside of a reinforcement sheet are stuck. below temperature - of the boundary where ** Young's modulus turns into 80% or less of the Young's modulus under each environmental temperature which is 25 degrees C -- being the same -- in the meantime The muffle-painting sheet with which the 1st coat which contains the precision pattern layer of less than 30% of

rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance at least was formed It is the approach of manufacturing on the conditions from which at least one of the temperature of the heat which starts at the time of the drying temperature of the 1st coat and the lamination of a base sheet and a reinforcement sheet becomes beyond the thermal metamorphism temperature of a base sheet and a reinforcement sheet. Thermal metamorphism temperature forms the 1st coat of the above in the top face of the 1st carrier sheet which has a mold-release characteristic more highly than the temperature of the heat which starts at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet, and a reinforcement sheet. After sticking the underside of the 1st coat, and the top face of the above-mentioned base sheet, the 1st carrier sheet is removed. After sticking in between the top face of the 1st coat, and the underside of the 2nd carrier sheet which has a mold-release characteristic more highly than the temperature of the heat which requires thermal metamorphism temperature at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet, and a reinforcement sheet on both sides of the above-mentioned reinforcement sheet, the 2nd carrier sheet is removed -- it constituted for it to come.

[0010] In the above-mentioned configuration, before piling up said 2nd carrier sheet and said reinforcement sheet, it constituted so that the 2nd coat might be formed in the underside of said 2nd carrier sheet.

[0011] Moreover, in the above-mentioned configuration, before removing said 1st carrier sheet, it constituted so that the 2nd coat might be formed in the underside of said base sheet.

[0012] Moreover, in each above-mentioned configuration, it constituted so that said base sheet and said reinforcement sheet might be replaced and applied.

[0013] Moreover, in each above-mentioned configuration, the thermal metamorphism temperature of said base sheet and said reinforcement sheet constituted, as it was in the range of 35-150 degrees C.

[0014] Moreover, in each above-mentioned configuration, the thermal metamorphism temperature of said base sheet and said reinforcement sheet constituted, as it was in the range of 60-150 degrees C.

[0015] The manufacture approach of a muffle-painting sheet that solid processing of this invention was carried out doubled the location, set it to the solid processing mold so that the distance of the part of a precision pattern layer and the part corresponding to this of a solid processing mold might be set to less than 30mm in the muffle-painting sheet manufactured by said approach, and it was constituted so that solid processing might be carried out above the thermal metamorphism temperature of a base sheet.

[0016] In the above-mentioned configuration, the rate of drawing expansion of said muffle-painting sheet constituted so that it might be 110% or more.

[0017] The muffle-painting sheet obtained by said approach constituted the solid configuration muffle-painting mold goods of this invention, as all or some of mold-goods front faces were worn and it had pasted up.

[0018]

[Embodiment of the Invention] Hereafter, this invention is explained in more detail, referring to a drawing. In addition, although the expression of a "top face" and a an "underside" is used in the description, this follows the directivity indicated on the drawing. Therefore, when the upper and lower sides of a drawing are reversed, a "top face" and an "underside" are reversed. The sectional view showing one example of the approach of manufacturing the muffle-painting sheet which drawing 1 and drawing 4 require for this invention, The sectional view showing one example of the muffle-painting sheet which drawing 2 and drawing 3 require for this invention, The top view showing one example of the pattern pattern formed in the muffle-painting sheet which drawing 5 requires for this invention, The sectional view showing one example of the approach of carrying out solid processing of the muffle-painting sheet which drawing 6 requires for this invention, the perspective view showing one example of the solid configuration muffle-painting mold goods which drawing 7 requires for this invention, and

drawing 8 are drawings explaining the rate of muffle-painting sheet drawing expansion concerning this invention. In one, a base sheet and 2 among drawing a precision pattern layer and 3 for the 1st coat and 2a A reinforcement sheet, In 4, a carrier sheet and 5 desiccation and 7 for the printing version and 6 The 1st carrier sheet, 8 the precision pattern pattern section and 10 for the 2nd carrier sheet and 9 The pattern section for alignment, 11 -- the grain pattern pattern section and 12 -- in a heat laminator and 15, the 2nd coat and S1 show the surface area of the muffle-painting sheet of solid configuration muffle-painting mold goods, and, as for a solid processing mold and 13, S2 shows [a muffle-painting sheet and 14] projected area, respectively.

[0019] In both this inventions, the top face of the base sheet suitable for solid configuration processing and the underside of a reinforcement sheet are stuck. In the meantime A figure, The muffle-painting sheet with which the 1st coat which contains the precision pattern layer of clear display patterns, such as an alphabetic character, a notation, a straight line, a grid, and a graphic form, at least was formed In the approach of manufacturing on the conditions from which at least one of the temperature of the heat which starts at the time of the drying temperature of the 1st coat and the lamination of a base sheet and a reinforcement sheet becomes beyond the thermal metamorphism temperature of a base sheet and a reinforcement sheet By performing desiccation of the 1st coat, and lamination of a base sheet and a reinforcement sheet on a carrier sheet with sufficient dimensional stability, the aforementioned problem concerning manufacture was solved on the muffle-painting sheet.

[0020] As shown in drawing 1 , dimensional stability the top face of the carrier sheet 4 which specifically has a mold-release characteristic well, and the underside of the base sheet 1 suitable for solid configuration processing Lamination, After forming in base sheet 1 top face the 1st coat 2 which contains precision pattern layer 2a of clear display patterns, such as the above-mentioned figure, an alphabetic character, a notation, a straight line, a grid, and a graphic form, at least (refer to A in drawing 1), After sticking the top face of the 1st coat 2,

and the underside of the reinforcement sheet 3 suitable for solid configuration processing (refer to I in drawing 1), a muffle-painting sheet is manufactured by removing the carrier sheet 4 (refer to U in drawing 1). The base sheet 1 and the reinforcement sheet 3 suitable for solid configuration processing reinforced with the carrier sheet 4 with sufficient dimensional stability also with heating at the time of desiccation of the (1) 1st coat 2 (2) The pattern pattern of precision pattern layer 2a inserted between the base sheet 1 and the reinforcement sheet 3 also by heating at the time of lamination with the reinforcement sheet 3 since there were few dimensional changes also has few location gaps, distortion of a pattern, and dimensional changes. Since this precision pattern layer 2a of this does not change by exfoliation of the carrier sheet 4, either, the precision pattern pattern section 9 of a muffle-painting sheet does not have location gap, distortion of a pattern, and a dimensional change.

[0021] However, that it is effective by the above-mentioned approach is only the case where the web material in the range whose thermal metamorphism temperature is 35-180 degrees C as the base sheet 1 suitable for solid configuration processing and a reinforcement sheet 3 is used. If the thermal metamorphism temperature of the base sheet 1 and the reinforcement sheet 3 is lower than 35 degrees C, the sheet itself fuses according to outside air temperature, thickness becomes an ununiformity, and since muffle painting stabilizes and becomes impossible, there is nonconformity. If higher than 180 degrees C, the muffle-painting sheet is understood that a predetermined configuration cannot carry out solid processing easily by experiment of this invention person. Thermal metamorphism temperature shows the temperature of the boundary where the Young's modulus when carrying out the tension test of the base sheet 1 and the reinforcement sheet 3 under each environmental temperature based on the measuring method of JIS K 7127-1989 turns into 80% or less of the Young's modulus under each environmental temperature which is 25 degrees C here. In addition, a tension test fixes the test piece of a base sheet with a width of face of 10mm in the distance between chucks of 5mm using the

chuck of a couple, and it carries out the end of a test piece with 500mm constant speed for /, applying the load of 20gf(s). As construction material of the base sheet 1 of this invention, and the reinforcement sheet 3, a vinyl chloride film, a polycarbonate film, an acrylonitrile butadiene styrene film, a polystyrene film, non-extended polyvinyl alcohol, a low crystallinity polypropylene film, a polyester copolymerization film, an amorphous polyethylene terephthalate film, a polybutylene terephthalate film, etc. can be used.

[0022] Moreover, as a carrier sheet 4 with sufficient dimensional stability, although there are biaxial-stretching polyester film, a biaxial-stretching polypropylene film, a triacetate film, a biaxial-stretching ethylene vinyl alcohol film, a polyimide film, etc. (1) at least one of the drying temperature of the 1st coat 2, and the temperature of the heat added at the time of the lamination of (2) base sheet 1 and the reinforcement sheet 3 from carrying out to beyond the thermal metamorphism temperature of the base sheet 1 and the reinforcement sheet 3 thermal metamorphism temperature is higher than the temperature of the heat which starts at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet, and the reinforcement sheet 3 -- it comes out and is limited to a certain thing. In addition, the surface of separation of these carrier sheets 4 has the mold-release characteristic by performing mold release processing of forming a mold release layer. As a lamination means with the above-mentioned reinforcement sheet 3, the heat laminating method (14 in drawing is a heat laminator), the dry laminate method, etc. are in the carrier sheet 4, the above-mentioned base sheet, and a pan.

[0023] Moreover, that it is effective by the above-mentioned approach is only the case where precision pattern layer 2a of the pattern of less than 30% of rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance is form, and when form the pattern layer of a pattern pattern with larger rate of pattern dimensional change allowance or location precision allowable tolerance than this, it is understand the case where it manufactures without the carrier sheet 4, a visual exterior, and that there is

almost no difference by experiment of this invention person. Here, it is the thing of the pattern pattern for which the rate of pattern change allowance understands clearly [nonconformities, such as distortion,] less than 30% of pattern pattern visually when the dimension of either the lengthwise direction of a pattern or a longitudinal direction is made to expand or reduce exceeding 30%, and a figure, an alphabetic character, a notation, etc. correspond to this. Location precision allowable tolerance moreover, with a less than **0.4mm pattern pattern It consists of two or more layers in which one or more combination whose color difference deltaE of each pattern pattern is four or more exists. Specifically When the location of at least one pattern shifts exceeding the direction of either a lengthwise direction or a longitudinal direction, and **0.4mm, location gap is known visually clearly, and when it becomes a molded-in-foil-decoration article, the heavy printing printing pattern which causes activity top inconvenience corresponds to this. The above-mentioned precision pattern layer 2a is constituted as be [choose / out of the group of the color ink layer which consists of a pigment, the pigment ink layer and pearl pigment which consist of resin binders, the photoluminescent pigment layer and color which consist of resin binders, and a resin binder] further alike in it being few. Moreover, the 1st coat 2 which contains the above-mentioned precision pattern layer 2a at least is formed on a roll coat besides a general-purpose printing means (gravure, offset, screen), a reverse coat, a lip coat, etc. The ink coat printed or painted by these means is dried until it disperses the solvent contained in ink and is lost with [of an ink coat front face] solid one with hot blast or far infrared rays.

[0024] In addition, in the above-mentioned approach, before sticking the top face of said carrier sheet 4, and the underside of said base sheet 1, what (refer to drawing 2) the 2nd coat 15 is formed in the top face of said carrier sheet 4 also for is made. In this case, the 2nd coat 15 is not limited to the layer containing the precision pattern layer of the pattern of less than 30% of rates of pattern dimensional change allowance, and less than **0.4mm of location precision allowable tolerance.

[0025] Moreover, in the above-mentioned approach, before removing said carrier sheet 4, what (refer to drawing 3) the 2nd coat 15 is formed in the top face of said reinforcement sheet 3 also for is made. In this case, the 2nd coat 15 is not limited to the layer containing the precision pattern layer of the pattern of less than 30% of rates of pattern dimensional change allowance, and less than **0.4mm of location precision allowable tolerance.

[0026] Moreover, the approach which does not form directly the 1st coat 2 which contains precision pattern layer 2a of the pattern of less than 30% of rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance in the base sheet in the range which is 35-180 degrees C at least also has thermal metamorphism temperature. For example, as shown in drawing 4 , thermal metamorphism temperature forms the 1st coat 2 of the above in the top face of the 1st carrier sheet 7 which has a mold-release characteristic more highly than the temperature of the heat which starts at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet 1, and the reinforcement sheet 3 (refer to A in drawing 4). After sticking the underside of the 1st coat 2, and the top face of the above-mentioned base sheet 1 (refer to I in drawing 4), The 1st carrier sheet 7 is removed (refer to U in drawing 4). After thermal metamorphism temperature sticks in between the underside of the 2nd carrier sheet 8 and the top face of the 1st coat 2 which have a mold-release characteristic more highly than the temperature of the heat which starts at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet 1, and the reinforcement sheet 3 on both sides of the above-mentioned reinforcement sheet 3 (refer to E in drawing 4), A muffle-painting sheet is manufactured by what the 2nd carrier sheet 8 is removed for (refer to O in drawing 4). Also in heating at the time of desiccation of the (1) 1st coat 2, the 1st carrier sheet 7 higher than the temperature and the 2nd carrier sheet 8 of the heat which requires thermal metamorphism temperature at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet 1, and the

reinforcement sheet 3 have few dimensional changes also by heating at the time of attachment by (2) base sheet 1 and the reinforcement sheet 3. Therefore, the pattern pattern of precision pattern layer 2a which could suppress the dimensional change of the base sheet 1 and the reinforcement sheet 3, and was inserted between the base sheet 1 and the reinforcement sheet 3 also has few location gaps, distortion of a pattern, and dimensional changes. Since this precision pattern layer 2a does not change by exfoliation of the 1st carrier sheet 7 and the 2nd carrier sheet 8, either, the precision pattern pattern section 9 of a muffle-painting sheet does not have location gap, distortion of a pattern, and a dimensional change.

[0027] In addition, in the approach using the above-mentioned 2nd carrier sheet 8, before piling up said 2nd carrier sheet 8 and said reinforcement sheet 3, what (refer to drawing 3) the 2nd coat 15 is formed in the underside of said 2nd carrier sheet 8 also for is made. In this case, the 2nd coat 15 is not limited to the layer containing precision pattern layer 2a of the pattern of less than 30% of rates of pattern dimensional change allowance, and less than **0.4mm of location precision allowable tolerance.

[0028] Moreover, in the approach using the above-mentioned 2nd carrier sheet 8, before removing said 1st carrier sheet 7, what (refer to drawing 2) the 2nd coat 15 is formed in the underside of said base sheet 1 also for is made. In this case, the 2nd coat 15 is not limited to the layer containing precision pattern layer 2a of the pattern of less than 30% of rates of pattern dimensional change allowance, and less than **0.4mm of location precision allowable tolerance.

[0029] Moreover, this invention may replace and apply the base sheet 1 and the reinforcement sheet 3 in the manufacture approach of the above muffle-painting sheet.

[0030] Moreover, it is desirable to choose the base sheet 1 and the reinforcement sheet 3 which fit solid configuration processing depending on the activity application of a muffle-painting sheet from the web material in the range where thermal metamorphism temperature is narrower. For example, for a household-

electric-appliances application, since importance is attached to very deep solid workability, if thermal metamorphism temperature does not select the construction material which is 35-150 degrees C, effectiveness is hard to be acquired also by the manufacture approach of the above-mentioned muffle-painting sheet. Moreover, since both the thermal resistance which was more excellent in the automobile interior part application, and very deep solid workability are required, if thermal metamorphism temperature does not select the construction material which is 60-150 degrees C, it is difficult to acquire effectiveness also by the manufacture approach of the above-mentioned muffle-painting sheet.

[0031] The muffle-painting sheet concerning this invention besides precision pattern layer 2a which constitutes the precision pattern pattern section 9 of less than 30% of rates of pattern change allowance, and less than **0.4mm of location precision allowable tolerance The pattern layer which constitutes the pattern section 10 for alignment may be formed, and the pattern layer which constitutes the pattern pattern section (it is the grain pattern pattern section 11 in the case of the grain) chosen from abstract shank patterns, such as grain, grain, and a marble, may be formed (refer to drawing 5). Alignment is carried out, and in case solid processing is carried out, productivity improves substantially by making the pattern section 10 for alignment into a method, such as reading with the photoelectric tube.

[0032] Since the muffle-painting sheet obtained by the above approach was wearing all or some of mold-goods front faces and has pasted up, the solid configuration muffle-painting mold goods (refer to drawing 7) of this invention have few location gaps of the precision pattern pattern section 9, distortion of a pattern, and dimensional changes. As the muffle-painting approach on the front face of mold goods using said muffle-painting sheet, carry out the coat of the binder and stick it, or carry out the coat of the hot melt agent, and heat press attachment is carried out, or the approach which has ****ed [the approach etc.] shaping simultaneous muffle painting enough and is carried out is in a muffle-

painting sheet. As construction material of mold goods, resin (an alloy is included), such as acrylonitrile styrene butadiene rubber, a polycarbonate, polypropylene, a polymethyl methacrylate, acrylonitrile styrene, polystyrene, polyethylene terephthalate, a polyamide, thermoplastic elastomer, and polyurethane, can be used in the approach of all above. Moreover, in addition to the case of shaping simultaneous muffle painting, it is not limited to the above-mentioned resin, but can use, the construction material, for example, the woody ingredient etc., other than resin etc.

[0033] In addition, although it faces performing muffle painting to a mold-goods front face using the above-mentioned muffle-painting sheet and it is necessary to carry out solid processing of the muffle-painting sheet according to the solid configuration of mold goods above the thermal metamorphism temperature of the base sheet 1 and the reinforcement sheet 3 When the rate of drawing expansion of a muffle-painting sheet is 110% or more especially at this time A muffle-painting sheet so that the distance of the part of precision pattern layer 2a of the pattern of less than 30% of rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance and the part corresponding to this of the solid processing mold 12 may be set to less than 30mm It is desirable to double a location and to set to the solid processing mold 12 (refer to drawing 6). It is because a muffle-painting sheet will be greatly extended by the time a muffle-painting sheet contacts the solid processing mold 12 in the part of the above-mentioned precision pattern layer 2a and location gap of the precision pattern pattern section 9, distortion of a pattern, and a dimensional change will be produced, if solid processing of a muffle-painting sheet is performed after the distance of the part of precision pattern layer 2a and the part corresponding to this of the solid processing mold 12 has separated widely. If the distance of the part of precision pattern layer 2a and the part corresponding to this of the solid processing mold 12 is less than 30mm as described above, since the part of the above-mentioned precision pattern layer 2a contacts the solid processing mold 12 in the condition before a muffle-painting

sheet is extended, or the condition with little [still] elongation of a muffle-painting sheet and the configuration is met, location gap of the precision pattern pattern section 9, distortion of a pattern, and a dimensional change can be lessened. If the above-mentioned distance exceeds 30mm, it will become difficult to suppress location gap of the precision pattern pattern section 9, distortion of a pattern, and a dimensional change. Moreover, it is more desirable to set so that the above-mentioned distance may be set to less than 20mm. As the solid processing approach, a vacuum forming, pressure forming, a heat press, the hydraulic press, etc. can be used. Moreover, the surface area S1 of the muffle-painting sheet of solid configuration muffle-painting mold goods is indicated to be the above-mentioned rate of drawing expansion by the percentage of the value which broke it by the projected area S2 (equivalent to the surface area of the muffle-painting sheet before carrying out solid processing) at the time of seeing from right above (refer to drawing 8).

[0034]

[Example] The following pattern layer a is formed in the top face of the following carrier sheet in gravure. (Example 1) The lamination which minds a polyurethane binder layer for the top face of the pattern layer a, and the underside of the following base sheet, Furthermore, the following pattern layer b and the following pattern layer c are formed in the top face of a base sheet in gravure. After carrying out sequential formation of the following pattern layer d and the following glue line by screen-stencil on it and sticking a reinforcement sheet on it further, the muffle-painting sheet was obtained by removing a carrier sheet. In addition, the desiccation conditions after each printing were made into 50 degrees C. Heating conditions were made into 70 degrees C at the time of the lamination of a base sheet and a reinforcement sheet.

Carrier sheet: Biaxial-stretching polyester film 25micrometer Thermal metamorphism temperature 205 degrees C Pattern layer a: A whole surface mat Acrylic resin A silica particle Base sheet : Polystyrene film 100micrometer Thermal metamorphism temperature 70 degrees C Pattern layer b: The pattern

section for alignment Acrylic resin Coloring agent One color (black)
Pattern layer c: Grain pattern pattern section Vinyl system resin Coloring agent Three colors (white, indigo blue, ashes)
Pattern layer d: Illumination alphabetic character precision pattern pattern section (a maximum of 10% of rates of pattern dimensional change allowance, **0.20mm of location precision allowance tolerance)
Vinyl system resin Coloring agent Four colors (illumination alphabetic-character section: yellow, blue, red, covered section:black) Glue line: Vinyl system resin Reinforcement sheet: Polystyrene film 200micrometer Thermal metamorphism temperature 70 degrees C [0035] The location was doubled and set so that it might become 20mm in the place from which the distance of the part of the pattern layer d and the partial part corresponding to this of a solid processing mold has separated this muffle-painting sheet most in the solid processing mold, vacuum attraction was carried out in the condition of having heated beyond the thermal metamorphism temperature of a base sheet and a reinforcement sheet, the muffle-painting sheet was extracted and solid processing was carried out at 160% of rates of expansion.
[0036] Next, after carrying out trimming processing of the periphery and pore of a muffle-painting sheet by which solid processing was carried out by laser, by inserting into a injection molding die and injecting transparence polystyrene resin, shaping and coincidence were painted and grain and an illumination alphabetic character cellular-phone case were obtained. This grain and illumination alphabetic character cellular-phone case had few location gaps of the precision pattern pattern section, distortion of a pattern, and dimensional changes about the muffle-painting sheet which was wearing the mold-goods front face and has been pasted up.
[0037] (Example 2) After carrying out sequential formation of the following stratum disjunctum and the pattern layer a in gravure, forming the following pattern layer b and a following glue line in the top face of the 1st carrier sheet of the following by screen-stencil on it and sticking the underside of a glue line, and

the top face of a base sheet, the 1st carrier sheet was removed. Moreover, sequential formation of stratum disjunctum and the pattern layer c was carried out in gravure at one side of the 2nd carrier sheet of the following. Subsequently, the muffle-painting sheet was obtained by [which remove lamination and the 2nd carrier sheet for the 2nd carrier sheet with which the printing layer was formed in the field which exfoliated the carrier sheet of the above-mentioned base sheet on both sides of the following reinforcement sheet in between] removing. In addition, the desiccation conditions after each printing were made into 80 degrees C. Heating conditions were made into 100 degrees C at the time of the lamination of a base sheet and a reinforcement sheet.

The carrier [first] sheet: Processed [mold release] biaxial-stretching polyester film 25micrometer Thermal metamorphism temperature 205 degrees C Stratum disjunctum: Acrylic resin Pattern layer a: Grain pattern pattern section Acrylic resin Coloring agent Two colors (yellow, tea)

Pattern layer b: Illumination alphabetic character precision pattern pattern section (a maximum of 30% of rates of pattern dimensional change allowance, **0.30mm of location precision allowance tolerance)

Acrylic resin coloring agent 5 color (illumination alphabetic character section: -- yellow, blue, and red and green --) The covered section: Black Glue line : Vinyl system resin Base sheet : Acrylic film 50micrometer Thermal metamorphism temperature 65 degrees C The second carrier sheet : [Processed / mold release / biaxial-stretching polyester film 25micrometer] Thermal metamorphism temperature of 150 degrees C Stratum disjunctum : Acrylic resin Pattern layer c: mat shank pattern section Acrylic resin containing a silica Reinforcement sheet: Polycarbonate film 250micrometer Thermal metamorphism temperature 77 degrees C [0038] The location was doubled and set so that it might become 12mm in the place from which the distance of the part of the pattern layer b and the part corresponding to this of a solid processing mold has separated this muffle-painting sheet most in the solid processing mold which serves as some injection-molding metal mold, vacuum attraction carried out in the condition

heated beyond the thermal-metamorphism temperature of a base sheet and a reinforcement sheet, the muffle-painting sheet extracted and solid processing carried out at 180% of rates of expansion.

[0039] Next, after having held the muffle-painting sheet by which solid processing was carried out as it was, having closed injection molding metal mold, having injected polycarbonate resin, painting to molding and coincidence and picking out a cast from metal mold, trimming clearance of the periphery of a muffle-painting sheet and the unnecessary part of a pore was carried out by laser radiation, and the grain and an illumination alphabetic character concomitant use automobile interior part were obtained. This grain and illumination alphabetic character concomitant use automobile interior part had few location gaps of the precision pattern pattern section, distortion of a pattern, and dimensional changes about the muffle-painting sheet which was wearing the mold-goods front face and has been pasted up.

[0040]

[Effect of the Invention] Since the manufacture approach of the muffle-painting sheet of this invention and the manufacture approach of the muffle-painting sheet by which solid processing was carried out, and solid configuration muffle-painting mold goods have a configuration as above, they have the following outstanding effectiveness.

[0041] The muffle-painting sheet of this invention namely, the manufacture approach It has a mold-release characteristic. The top face of a carrier sheet with sufficient dimensional stability, and the underside of the above-mentioned base sheet Lamination, The 1st coat which contains the precision pattern layer of the pattern of less than 30% of rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance at least is formed in the top face of a base sheet. After sticking the top face of the 1st coat, and the underside of the above-mentioned reinforcement sheet, a muffle-painting sheet is manufactured by removing a carrier sheet. Or the 1st coat which has a mold-release characteristic and contains the precision pattern layer of the pattern of

less than 30% of rates of pattern dimensional change allowance and less than **0.4mm of location precision allowable tolerance at least on the top face of a carrier sheet with sufficient dimensional stability is formed. After sticking the underside of the 1st coat, and the top face of the above-mentioned base sheet, the 1st carrier sheet is removed. After sticking in between the top face of the 1st coat, and the underside of the 2nd carrier sheet which has a mold-release characteristic more highly than the temperature of the heat which requires thermal metamorphism temperature at the time of the lamination of the above-mentioned drying temperature and the above-mentioned base sheet, and a reinforcement sheet on both sides of the above-mentioned reinforcement sheet, A muffle-painting sheet is manufactured more to remove the 2nd carrier sheet. In addition, a base sheet and a reinforcement sheet may be replaced and applied.
[0042] Therefore, the pattern pattern of the precision pattern layer in which the base sheet and reinforcement sheet suitable for solid configuration processing reinforced with the carrier sheet with sufficient dimensional stability were formed between the base sheet and the reinforcement sheet also by heating at the time of desiccation of a coat also of heating at the time of attachment by the base sheet and the reinforcement sheet since there were few dimensional changes also has few location gaps, distortion of a pattern, and dimensional changes. Since this precision pattern layer does not change by exfoliation of a carrier sheet, either, the pattern pattern of a muffle-painting sheet does not have location gap, distortion of a pattern, and a dimensional change.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing one example of the approach of manufacturing the muffle-painting sheet concerning this invention.

[Drawing 2] It is the sectional view showing one example of the muffle-painting sheet concerning this invention.

[Drawing 3] It is the sectional view showing one example of the muffle-painting sheet concerning this invention.

[Drawing 4] It is the sectional view showing one example of the approach of manufacturing the muffle-painting sheet concerning this invention.

[Drawing 5] It is the top view showing one example of the pattern pattern formed in the muffle-painting sheet concerning this invention.

[Drawing 6] It is the sectional view showing one example of the approach of carrying out solid processing of the muffle-painting sheet concerning this invention.

[Drawing 7] It is the perspective view showing one example of the solid configuration muffle-painting mold goods concerning this invention.

[Drawing 8] It is drawing explaining the rate of muffle-painting sheet drawing expansion concerning this invention.

[Description of Notations]

1 Base Sheet

2 1st Coat

2a Precision pattern layer

3 Reinforcement Sheet

4 Carrier Sheet

5 The Printing Version

6 Desiccation

7 1st Carrier Sheet

8 2nd Carrier Sheet

9 Precision Pattern Pattern Section

10 Pattern Section for Alignment

11 Grain Pattern Pattern Section

12 Solid Processing Mold

13 Muffle-Painting Sheet

14 Heat Laminator

15 2nd Coat

S1 Surface area of the muffle-painting sheet of solid configuration muffle-painting mold goods

S2 Projected area

[Translation done.]

* NOTICES *

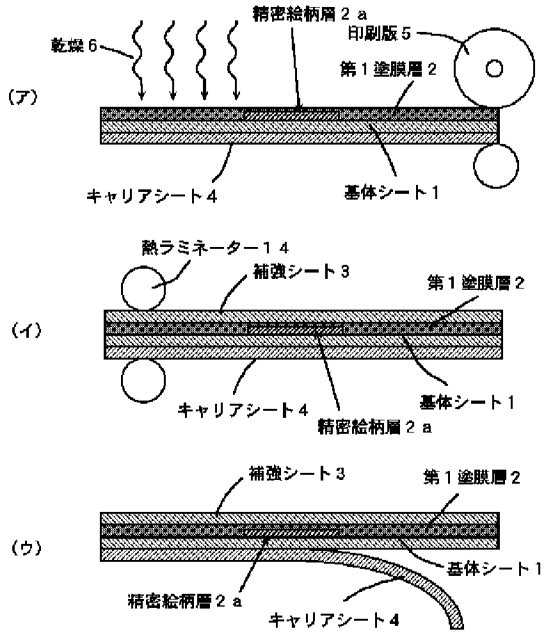
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

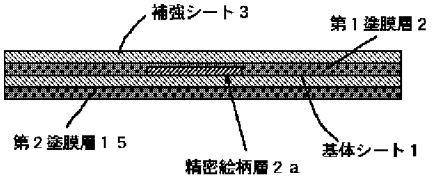
3.In the drawings, any words are not translated.

DRAWINGS

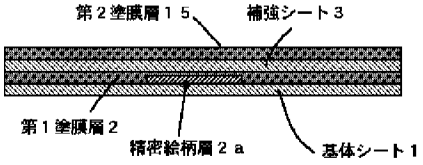
[Drawing 1]



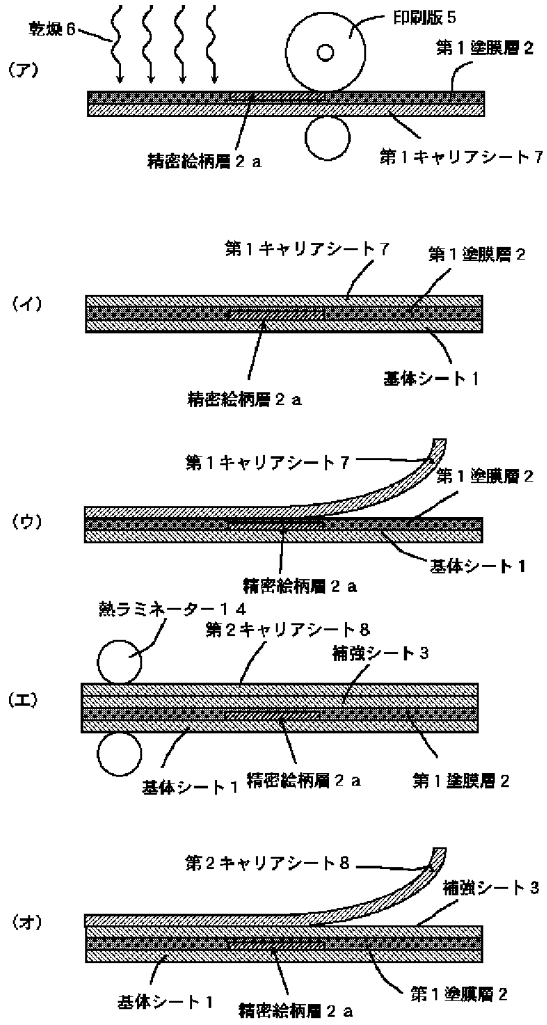
[Drawing 2]



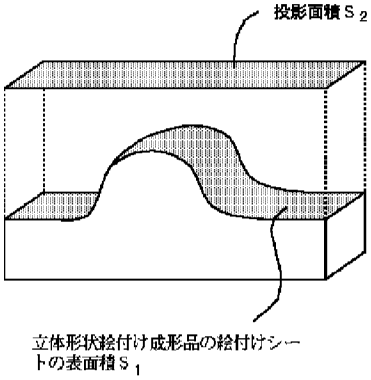
[Drawing 3]



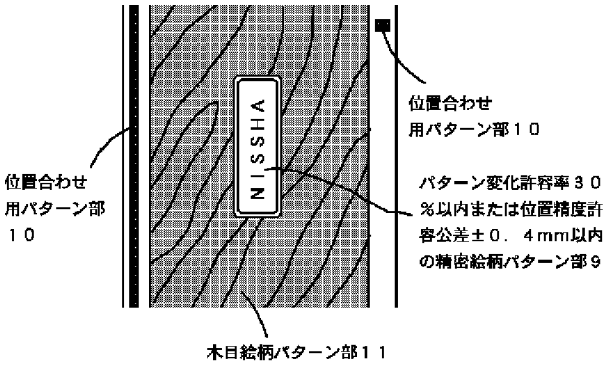
[Drawing 4]



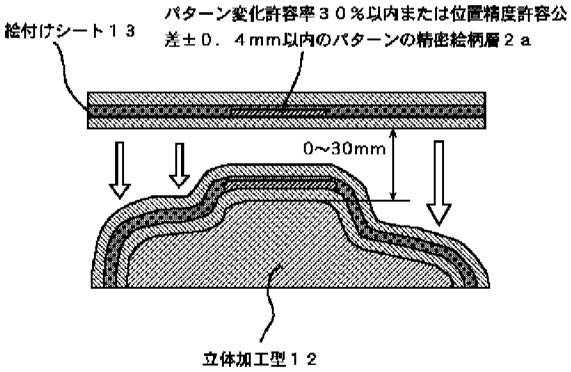
[Drawing 8]



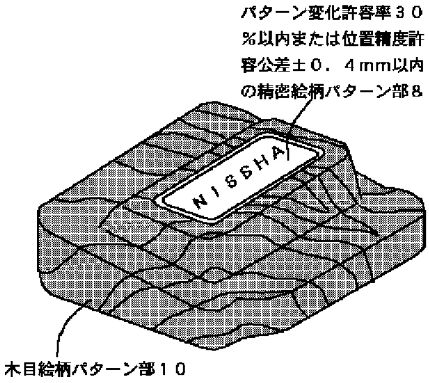
[Drawing 5]



[Drawing 6]



[Drawing 7]



[Translation done.]